

Personality Type and Its Influence on Cognitive Style

An Honors Thesis (HONR 499)

by

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Abstract

In the world of education, individualization and differentiation of instruction are all the rage. However, these two instructional methods require numerous additional hours of hard work by teachers to make the required changes to their lesson plans and instructional materials. Before they can do this, teachers must take the days, sometimes even weeks, to learn their students' preferred cognitive styles. As a future educator, I was wondering if there was a better way to more efficiently learn my students' cognitive styles. I decided that if I could link cognitive styles to something easier to determine about my students, such as their Myers-Briggs personality type, then I could more quickly increase my understanding of my classroom. This thesis explores the Myers-Briggs Type Inventory (MBTI), along with two different cognitive style evaluations, Kirton's Adaptation-Innovation Inventory (KAI), and Kolb's Learning Style Inventory (LSI), and the connections they share. This thesis also includes my plans for future research, and the implications that it could have on our current educational system and my own teaching.

Acknowledgements

I would like to thank Dr. Paul Ranieri for pushing me to dig deeper into this subject. This project would not have nearly as much depth and application as it does if it were not for you.

I would like to thank all of my teachers, both past and current, for showing me what a joy it is to influence and shape young minds. It is because of my experiences with each of you that I wanted to become a teacher.

I would like to thank my parents, Darrel and Janet, and my sister, Taylor, for always encouraging me to pursue my dreams and to do my best. Thank you for 22 years of unconditional love and support. I would not be the person I am today if it were not for the three of you.

Process Analysis Statement

This thesis was started due to my love of personality types, and the implications they have on how a person thinks and acts. As a future educator, I'm always paying attention to these same traits in my students to gauge how much of the information I'm teaching they are absorbing. Once I realized that the traits I was watching to gauge my students learning were similar to those that are indicated through the Myers-Briggs Type Indicator (MBTI), I started wondering if there was a way to connect personality type and cognitive style. As I formulated my hypothesis that the two would in fact be related, and I began my research I discovered that while some studies have indicated a potential link, that no official psychological or educational protocol has been put into place connecting personality type and cognitive style. I did a lot of research on the MBTI, Kirton's Adaptation-Innovation Inventory (KAI), and Kolb's Learning Style Inventory (LSI), and created a theory and a plan for researching how these measures of personality type and cognitive style can be interconnected to increase effectiveness in the classroom. However due to lack of time, and a classroom to study, I was not able to carry out any of my experimental protocol, which is detailed at the end of the thesis.

Thesis

"Instruction begins when you, the teacher, learn from the learner. Put yourself in his place, so that you may understand that he learns and the way he understands it."

- Kierkegaard

In the world of education today, one word is used more than any other, individualization. Merriam Webster defines the verb individualize as, "to adapt [something] to the needs or special circumstances of an individual" (Merriam-Webster 2018). This word when put into action is one that can make education drastically more effective, yet the use of this word around educators is usually met with signs, groans, and eye-rolls. Why? Because in order to individualize instruction, they must take the time to learn every one of their students' cognitive styles before they can even begin to tailor learning activities that engage those various styles. With teachers having 30-100 different students, this process is often both time and energy consuming, yielding few to no results due to the amount of time it takes to implement the individualized instruction. In addition to this, each semester can bring an entirely new set of students, requiring teachers to start their process of individualization completely over.

As a future educator, I couldn't help but wonder if there was a way to make this process more efficient. While studying the Myers-Briggs Type Indicator (MBTI), in a psychology class, it struck me that if I could connect the MBTI, which can be easily determined with a little observation, with more complicated to determine learning preferences, which take more time to learn; then I can increase the efficiency and depth of understanding of my teaching. I have chosen

the MBTI for the personality indicator for this thesis because it can explore “personality” in depth while also more easily determining a person’s personality classification. I have chose the Kirton Adaptation-Innovation Inventory and Kolb’s Learning Style Inventory as the cognitive preference indicators since they are the ones most commonly used by teachers today. This paper will explore the MBTI and learning preferences (via the LSI and KAI), and will assess the different connections between the MBTI and cognitive styles and the implications that these connections have in for the classroom.

Understanding the Myers Briggs Type Indicator

The MBTI is a personality assessment created by two women, Isabel Briggs Myers and Katharine Cook Briggs, as an expansion of Carl Jung’s theory of psychological types (Kummerow, J. and Maguire, M., 2010). Jung initially created three dichotomous types (Extraversion/Introversion, Sensing/ iNtuition, and Thinking/Feeling) to distinguish the differences between Sigmund Freud and Alfred Adler (Boghikian-Whitby, S. and Mortagy, Y., 2016)(Kummerow, J. and Maguire, M., 2010). Myers and Briggs then later added the fourth dichotomy, judging/perceiving, and created the assessment known as the Myers-Briggs Type Indicator. This indicator is made to determine an individual’s preference for each of the dichotomies. These preferences are what describe an individual’s personality type. Jung defined personality type as, “a characteristic model of a general attitude” (Boghikian-Whitby, S. and Mortagy, Y., 2016). He goes further to say:

"First and foremost it is a critical tool for the research worker, who needs definite points of view and guidelines if he is to reduce the chaotic profusion of individual experiences to any kind of order. Secondly, a typology is a great help in understanding the wide variations that occur among the individuals..."

(Boghikian-Whitby, S. and Mortagy, Y., 2016)

The key with the MBTI is to understand that each personality type is not set, but is a fluid scale. Each of the dichotomy preferences determines the letter that is given to create a four-letter "type". Each of these preferences is also given a percentage to represent how often the individual chooses one preference over the other. The following two figures are my personal MBTI results that were taken seven months apart. Figure 1 was taken on October 17, 2017 and Figure 2 was taken May 17, 2018.

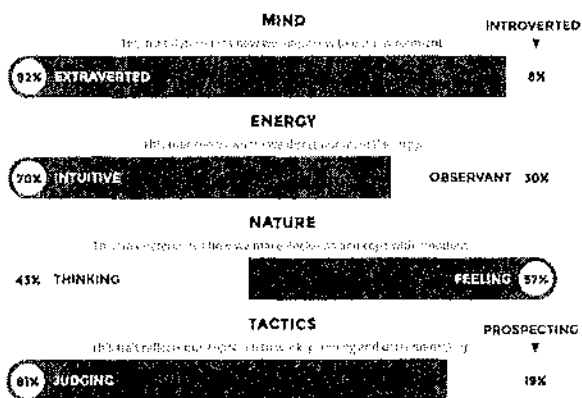


Figure 1 (NERIS, 2018)

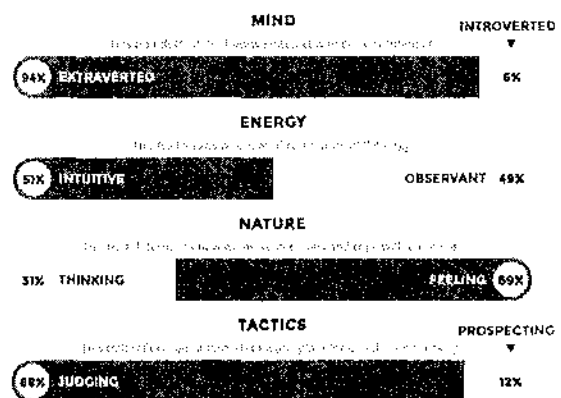


Figure 2 (NERIS, 2018)

Figures 1 and 2 are a side-by-side comparison of my own MBTI results. Even though my four-letter type (ENFJ) remained the same, some preferences were stronger or weaker in May 2018 (Figure 2) than they were in October 2017 (Figure 1). I believe these slight differences are due to the environmental changes that occurred between the two tests (e.g., location, season, school break)

Each of the four dichotomies explores a different aspect of how a person gains energy, perceives information, makes decisions, and views the world. The Extraversion/Introversion dichotomy examines where people direct their energy and where they gain their energy. Extraverts tend to focus their energy on the outside world, and they gain energy from being around groups of people. They are often the first to speak their opinion, raise their hand in class, or volunteer to help (Boghikian-Whitby, S. and Mortagy, Y., 2016). Extraverts also tend to be described as talkative and outgoing. On the other hand, Introverts focus their energy inward, and they gain their energy from time alone. Their thoughts focus on inward thoughts and feelings, and they are generally described as shy and soft-spoken. They tend to only speak after they have been spoken to, and are exhausted after being around groups of people.

The second dichotomy (Observant (Sensing)/ iNtuition) is called the perception function. This dichotomy is focused around how a person takes in and processes information. Individuals who are classified as sensing, focus on their environments and the information they can take in through their five senses (sight, smell, hearing, taste, and touch). Individuals who are classified as iNtuitive, rely on past experiences and relationships to determine trends and patterns. They then use these patterns to assess their current and future situations. (Boghikian-Whitby, S. and Mortagy, Y., 2016)

The third dichotomy (Thinking/Feeling) is called the judgment function. This dichotomy focuses on how people evaluate and judge information. Thinkers

base their judgments on objective analyses of situations, and only judge after analyzing all of the facts. They are task oriented, and often have trouble expressing their emotions. Feelers are person oriented, and make judgments based on their assessment of personal values and other's feelings. They are known to be empathetic, and express their emotions often.

The fourth and final dichotomy focuses on how individuals interact with the outer world. Judgers favor structure, order, and control. They are happiest when they can find closure or complete tasks. Judgers also like a planned and organized approach to life. On the other hand, Perceivers tend to favor a lifestyle that is flexible and spontaneous. They are open to changes, and tend to live unplanned lives, so they can stay open to new possibilities and experiences (Moutafi, J., et.al., 2003).

The letters representing the preferences for each of the four dichotomies are combined to create the individual's Myers-Briggs Type. There are 16 combinations, each possessing their own characteristics and traits. As with anything else, some types are more common than others. The following tables break down the frequency of each dichotomy preference, and the commonality of each type. Figure 3 shows the percentage of Americans who are classified into each dichotomy preference, and Table 1 shows the percentage of Americans that comprise each type. (Kummerow, J. and Maguire, M., 2010)

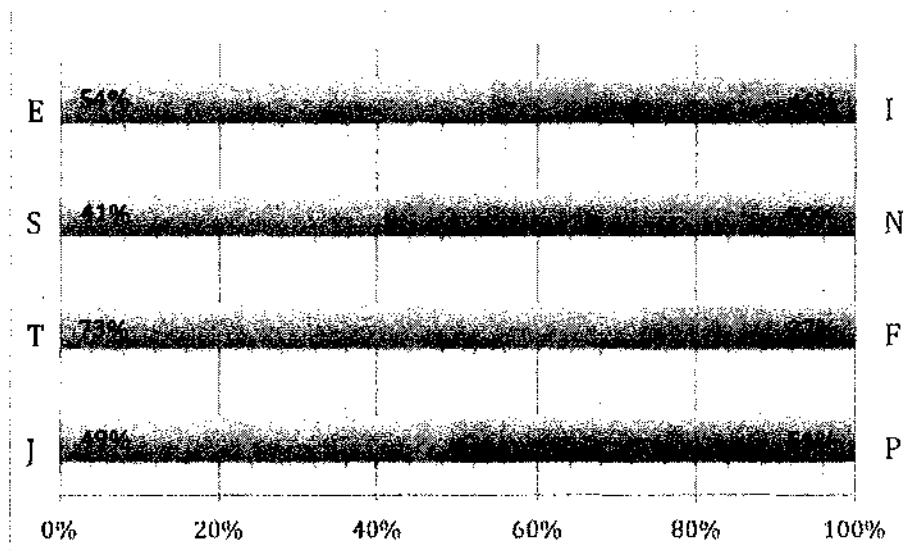


Figure 3 (Kummerow, J. and Maguire, M., 2010)
Figure 3 shows the percentage of America's population represented by each of the MBTI preferences.

ISTJ	ISFJ	INFJ	INTJ
11.6%	13.8%	1.46%	2.1%
ISTP	ISFP	INFP	INTP
5.4%	8.8%	4.4%	3.3%
ESTP	ESFP	ENFP	ENTP
4.3%	8.5%	8.1%	3.2%
ESTJ	ESFJ	ENFJ	ENTJ
8.7%	12.3%	2.5%	1.8%

Table 1 (Figueroa, Q., 2015)
Table 1 shows the percentage of America's population represented by each MBTI type.

While MBTI types are pretty evenly distributed, some are noticeably less common than others. The top four least common types (in order) are: INFJ,

ENTJ, INTJ, ENTJ. Combined, these four types comprise less than 8% of the population. As you will see in the next section about cognitive preferences, the IN and EN types commonly represent the most abstract cognitive preferences. These abstract cognitive preferences and ways of thinking inherently set these students up to be the most successful both in and outside of the classroom.

Understanding the KAI and LSI

For this analysis, the MBTI will be used to find connections with two different cognitive philosophies, Michael Kirton's Kirton Adaptation-Innovation Inventory (KAI) and David Kolb's Learning Style Inventory (LSI). Before connecting the MBTI with the KAI or LSI, let's explore each of these cognitive philosophies.

The KAI is a paper-and-pen, self-assessment based on a sliding scale. It is a 32-question assessment, with each question asking test takers to answer according to their preference or traditional tendency to maintain adaptive or innovative behaviors over long periods of time. Their responses are recorded on a "Very hard" to "Very Easy" scale, with each of the answer options being converted to a 1-5 score for tabulation. The score for each subscale is calculated to give individuals their preference for each of the dichotomies, and then the subscale totals are combined for the overall score. Scores can range from 32-160 on a scale moving from adaptive to innovative (Isaksen, S. et.al., 2003). The KAI is composed of three difference subscales, the Sufficiency-Proliferation of Originality (SO), Efficiency (E), and Rule/Group Conformity (R) (Isaksen, S. et.al.,

2003). Each of these subscales is represented as a dichotomy, having an adaptor preference and an innovator preference.

The SO subscale focuses around the way different, original ideas are produced. Adaptors in the SO category are likely to generate ideas that are extremely practical and are directly linked to the problem or situation at hand. They also tend to generate as few ideas/solutions as are necessary. Innovators on this subscale tend to generate ideas that are both directly related to the problem/situation at hand, and ideas that are considered non-traditional or groundbreaking. Innovators also tend to generate an over-abundance of ideas (Isaksen, S. et.al., 2003).

The KAI E dichotomy is centered on preference for detail, precision, and thoroughness. Adaptors on the E subscale are centered on the task at hand, so they tend to pay close attention to the fine details of the problem/situation. Adaptors are more likely than innovators to find a direct solution, using very organized, relevant data and a structured schedule (Isaksen, S. et.al., 2003). Innovators on the E subscale look at the problem/situation from a wider view, often time ignoring the details that tend to bore them. This typically results in sacrificing the immediate or quick solution, and creating something completely different. The innovators approach is typically less stressful, and lower risk than their counterparts (Isaksen, S. et.al., 2003).

The final KAI dichotomy, the R subscale, is centered around how the individual prefers to work with pre-established rules and systems. Adaptors on

the R subscale favor the structure that rules and guidelines supply, and spend most of their time abiding closely by them. They also favor group conformity, often times valuing group cohesion and collaboration over sharing their own ideas (Isaksen, S. et.al., 2003). Innovators on this subscale strongly emphasize new, unique, cutting-edge pathways over traditional protocol. They are not likely to conform to a group, usually isolating themselves to work alone. More often than not, their solutions and pathways bend or break any rules that were already in place. (Isaksen, S. et.al., 2003).

When researchers have tried to find connections between the MBTI and KAI, they have found correlations with the N (Intuitive) and P (Perceiving) MBTI factors, and an innovative cognitive preference. For those possessing the N MBTI type and an innovative KAI, an overall correlation value (r) of 0.55 was found. Table 3 shows the subscales and their correlation values to those possessing the N-type (Isaksen, S. et.al., 2003).

Subscale	Correlation value (r)
Sufficiency-Proliferation of Originality (SO)	0.48
Efficiency (E)	0.32
Rule/Group Conformity (R)	0.47

Table 2 (Isaksen, S. et.al., 2003)

This table shows the correlation (r) values for people whose MBTI contains an N preference and who possess an innovative cognitive preference for each of the KAI subscales.

For individuals possessing the P (Perceiving) MBTI type and an innovative KAI preference, an overall r -value of 0.44 was found. Table 4 shows the subscale

correlation values for individuals of the P-type and innovative preferences
(Isaksen, S. et.al., 2003)

Subscale	Correlation value (r)
Sufficiency-Proliferation of Originality (SO)	0.32
Efficiency (E)	0.42
Rule/Group Conformity (R)	0.33

Table 3 (Isaksen, S. et.al., 2003)

This table shows the correlation (r) values for people whose MBTI contains a P preference and who possess an innovative cognitive preference for each of the KAI subscales.

Correlation Value (r) Range	Classification
-1 to -0.5	Strong Negative Correlation
-0.5 to -0.3	Moderate Negative Correlation
-0.3 to -0.1	Weak Negative Correlation
0	No Correlation
+0.1 to +0.3	Weak Positive Correlation
+0.3 to +0.5	Moderate Positive Correlation
+0.5 to +1	Strong Positive Correlation

Table 4 (Pearson Product-Moment Correlation, 2018)

This table shows the ranges for each classification of correlation values (r), showing that all correlations that were found for Isaken's study were considered to be moderate, positive correlations.

According to Isaken's study, positive correlations were found for each of the factors (Intuitive and Perceiving) that were tested against KAI preferences. This positive correlation confirms that as the strength of the MBTI preference

increases, so does the innovative preference for that KAI type. Table 2 shows a strong correlation for those possessing the MBTI N (Intuitive) preference and the innovative preference for Sufficiency-Proliferation of Originality (SO) and Rule/Group Conformity (R) subscales, meaning that the stronger the N preference is, the more likely and stronger the innovator type on these two subscales. This confirms my initial thoughts, and personal experiences that those possessing the N preference are more likely to come up with non-traditional or ground breaking ideas and to use unique or cutting-edge pathways over traditional ones.

Table three tells us a similar story for those possessing the MBTI P (Perceiving) preference and the innovative type for the Efficiency (E) subscale. This moderately-strong, positive correlation tells us that those possessing the MBTI P preference tend to look at problems from a wider view, but typically ignore details that bore them, typically leading to an entirely new solution to a traditionally quick to solve problem. Just as with the last strong, positive correlations, the stronger the P preference, the stronger the innovative type for the E subscale.

Not only does the research show a correlation between the KAI and the MBTI, but my own educational and learning experiences confirm this correlation as well. As I mentioned earlier, my MBTI classification possesses the N preference. After researching the KAI, I have discovered that I am an adaptor on the E subscale, and an innovator on the SO and R subscales, just as the research shows. Because these strong correlations exist between the KAI and

the MBTI, while the research and my personal experiences confirm what was discovered, I believe these correlations will hold true for my students as well.

Now that we have seen some of the connections between the MBTI and KAI, let's explore Kolb's LSI and its connections with the MBTI. The LSI is a 12-question assessment in which the individual taking it is asked to rank sentence endings from 1-4 based on personal preference. Each of the sentence endings corresponds to one of the four different learning orientations; Concrete Experience, Abstract Conceptualization, Active Experimentation, and Reflective Observation. After the sentence endings have been ranked, the totals for each learning orientation are summed, a formula plots the differences to calculate the learning orientation of the individual. Each orientation has a unique perspective on how individuals process and organize information, and on how individuals thrive in a different environment (Matthews, D., 1996).

Concrete Experience learners, also known as Divergers, favor an experience-based, people-involved approach. They have the ability to view information, problems, and situations from many different perspectives and approach solutions based on observations and past-experiences rather than actions. These learners have the lowest academic performance among their peers, and the lowest self-confidence in their academic abilities (Matthews, D., 1996).

Abstract Conceptualization learners, also known as Assimilators, favor an analytical approach to information, and are known for their ability to take a large amount of information and put it into a concise, organized format. Assimilators

are good at taking separate observations and connecting them with a singular explanation. These learners favor data sets and concrete information as opposed to abstract concepts or real-world scenarios (Matthews, D., 1996).

Active Experimentation learners, also known as Convergers, favor an action-based, active approach to learning. These learners are good at taking philosophies, theories, and other abstract concepts and finding practical uses and real-life applications for them. Convergers also are good at making decisions and solving problems that are presented to them. Convergers have the highest academic performance, and the best self-confidence in their academic abilities (Matthews, D., 1996).

Reflective Observation learners, also known as Accommodators, take an observation-based, impartial approach to learning. Accommodators learn best from hands-on activities, rely on others for information, and are the learners who typically carry-out any plans or experiments that are necessary to attain information. These students are considered to be doers. They are typically the first ones to dive into a project, while other students give them information and instructions. Accommodators and Assimilators have a similar academic performance, and share a similar self-confidence in their academic abilities (Matthews, D., 1996).

Kolb's LSI inspired a study by Saint Louis University which works to connect MBTI with learning style. This study was a comprehensive, eight-year study called TRAILS (Tracking Retention and Academic Integration by Learning

Styles). For this study, the first two dichotomies of the MBTI were assigned a label for their patterns. Table 5 shows the assignments of these labels with their respective MBTI Combinations, and the percentage of the population that fits into each of Kolb's LSI categories (Schroeder, C., 1993)

MBTI	LSI Label	Percentage of population (%)
Extraverted- Sensing (ES)	Concrete Experience	50
Introverted- Sensing (IS)	Abstract Conceptualization	20
Extraverted- Intuitive (EN)	Reflective Observation	20
Introverted- Intuitive (IN)	Active Experimentation	10

Table 5 (Schroeder, C., 1993)

This table shows the percentage of Americans that possess the combination of the first two MBTI preferences and their corresponding cognitive classifications according to Kolb's LSI.

While these classifications are similar to Kolb's LSI, there are some differences. The TRAILS study classifies concrete active learners as "action-oriented realists", who are the most practical of the four groups and learn best when connections and information are obvious. The concrete reflective learners are described as "thoughtful realists" who prefer to work at their own pace, and who tend to work at a slower pace only dealing with what is real and factual. Concrete reflective learners do not like to work with theoretical or abstract concepts. Abstract active learners have a wide-range of interests, and focus on making things happen. They use their action-oriented thinking to look at previous thinking as a challenge, and their preference for new possibilities to create change. Individuals in the abstract reflective category are invested in learning just

for the sake of learning. They strive for deep understanding, and are typically described as introspective and thoughtful (Schroeder, C., 1993).

The TRAILS study found that both the concrete active and concrete reflective learners could be at a disadvantage when it comes to taking pen-and-paper tests. This is due to the fact that most tests are focused on how quickly students identify and manipulate information, and since these two types of learners struggle with identifying information and working quickly, their scores reflect their struggles. In fact, when looking at the average scores of each type of learner on different standardized tests (GRE, MAT, MCAT, LSAT, ACT), Abstract reflective learners always had the highest mean score followed by abstract active, concrete reflective, and concrete active. On the SAT, the average score for abstract reflective learners, out of 1600, was 1110, while the average score for concrete active learners was 932 (Schroeder, C., 1993).

So what does all of this MBTI, KAI, LSI, and TRAILS information mean for education and the modern secondary school classroom? As a future educator I am constantly looking for ways to increase the efficiency and depth of understanding in my classroom. I believe that using the MBTI, KAI, and LSI and their connections on a normal basis in my classroom is the key to making myself a better teacher, and increasing understanding for my students.

While the data connecting the MBTI to either the KAI or the LSI is limited, I believe it shows great potential. Most studies were done using subjects of a variety of ages, and were focused only on one or two parts of each dichotomy. I

believe that if tests were done using students who are regularly in a learning environment (students in grades 1-12), correlations would become stronger between the MBTI and either the KAI or LSI on all dichotomy levels. Since this idea is so new, I have drawn a lot upon my own learning experiences and have seen the connections between my MBTI and my cognitive style. Drawing upon the research that has already been done and my personal experiences, I believe I can improve the quality of my students' education and their experiences in my classroom.

My Personal Experiences and Case Study

As we discussed above, the MBTI is focused around how people gain energy, perceive the world, and make decisions. The KAI and LSI are focused around how people receive, interpret, and produce information most efficiently. My MBTI type is ENFJ. This means that I get my energy from being around people, I rely on past experiences to analyze information, I make decisions based on others' feelings, and I favor structure and control. I have seen this influence my cognitive style numerous times over my educational career as a student.

On the KAI, my results are that I prefer the Innovation dichotomy for the SO and R subscales and the Adaption dichotomy for the E subscale. Since I possess the MBTI N-type, my personal results are exactly in line with the correlation data given in Table 2. My Innovation preferences for the SO and R subscales are the two with the strongest statistical correlations.

For the LSI I am considered a Converger, meaning I prefer an active learning environment, and I take philosophies and theories and find practical, real-world applications for them. This paper is enough to prove the second description to be true. Convergers also have extremely high levels of self-confidence in their academic abilities, something that I have always possessed. When the LSI was used for the TRAILS study, my MBTI would make me an Abstract Active learner according to Table 4. The description for Abstract Active learners is, "Abstract active learners have a wide-range of interests, and focus on making things happen. They use their action-oriented thinking to look at previous thinking as a challenge, and their preference for new possibilities to create change."

My own experiences as a student have confirmed the data that I have found and compiled. During my educational career as a student, I have experienced classrooms that use personality and cognitive style to influence teaching methods, and I have experienced classrooms that do not. Classrooms that incorporated cognitive and personality styles played to my strengths. These teachers took the time to either have us take cognitive style assessments, or set aside one-on-one time to talk to us and ask us questions so they could get to know our personalities. It was these teachers who were always able to rephrase or change the scenario to increase my understanding and chance of a successful outcome. These teachers are the ones who were able to push my limits and grow me the most. The teachers that who did not incorporate personality or cognitive influence were the classes where I was the least engaged, and felt like I didn't

learn or grow much at all.

Out of the teachers who were able to change the scenario or environment for not only myself, but for other students to be able to learn and understand better, the ones who were able to manipulate their classrooms and teaching styles the easiest were my science teachers. These teachers were able to use visual aids like graphs and charts for the visual learners, were able to hand physical objects to the kinesthetic learners, and were able to provide auditory lectures, instructions and inline resources for the auditory learners. In addition to this, science teachers are able to restructure the information given for a single problem very easily. For learners whose cognitive preferences work best with given numerical information, these students can be grouped together to figure out the mathematical aspect of the question or, the question and concept can be presented in terms of numbers. For the more abstract thinkers, like myself, problems can be presented in a way that makes them a puzzle. It was these types of problems and scenarios that forced me to push myself and taught me the most as a result. This is why I believe as a science teacher, I am able to more easily incorporate this type of individualized teaching into my curriculum and why I hope to be able to do even more intentionally for my students.

Seeing this confirmation of the incorporation of personality and cognitive style in my own educational career has convinced me that these trends should be true for most, if not every other learner. As I transition from student to teacher in a classroom, I believe that using the MBTI and the KAI or LSI to figure out student's cognitive styles is essential to increasing understanding and efficiency

in the classroom especially given the importance of science education today and the number of pupils secondary teachers see from year to year. As a student, I can specifically remember the activities I learned the most from, and each of these activities are the activities that were designed to tailor to my cognitive style and learning preferences. If I can successfully incorporate the influence of personality and cognitive style into my classroom, not only will I have a better chance of keeping my students engaged, which is critical at the secondary level, but I will have a better chance of pushing and growing my students to achieve true understanding and success. Making connections between the MBTI and the KAI and LSI are essential to the progress of our education system today, because it is comprised of individuals who tend to shut down and close off when met with boredom or challenges they don't know how to solve.

As I have gone through my student teaching, I have noticed a few of my students who, like me, seem to fit each profile in an obvious way. The first student, Student X possesses the ES traits in their MBTI. As this student receives information, they tend to only be successful on their own when the information given to them is given in a plain, "this is all the information you need, now solve," kind of way. Student X struggles to make inferences and pull additional information in, and tends to rely on her senses and past experiences to determine her approach to solving whatever problem is in front of her. This is something that is typically not super harmful, but in a chemistry setting, especially at the beginning of the year, the information being given is typically things students have never seen before. This information often has to be inferred

from an experiment or data table. Because of her cognitive preferences, Student X has experienced a lot of frustration with her understanding and ability to solve problems.

In a similar way, Student Y, who possesses the EN preferences in his MBTI is very good at inferring patterns and information from a lab or from data sets. He tends to jump immediately into whatever we are doing, sometimes to a fault, since directions are often given as we go along. Student Y is also very good at taking a lot of theories, information, and patterns and creating a simple, concise explanation that summarizes the patterns and information in a way his classmates will easily understand.

When I engage in the research described in the next section and continue this project, I would hope to verify my current hunches about such students as these, and design pedagogy that begins where they are, but moves each of them forward in a way that broadens their current tendencies and skills.

Future Research

Based on the research I have done and the connections I think I can make based on that research, a few questions come to mind. First, if the data and connections are a true reflection of my experiences, will that be the case for most if not all of my students? Second, how do I test the validity of the data and connections for others? Third, once those connections are proven, how do I educate other teachers on how to use them to enhance the learning in their classrooms?

Before I go any further let me acknowledge the fact that before any research can be done, I will have to seek approval for my research from whatever school district in which I am teaching during this process. I also realize that I will need to provide all necessary documentation to the institutional review board of the school district, college, or university that is allowing me to do this research. I also know that research with minors is a unique situation. Not only do I need to get consent from the research subjects, but I also have to obtain consent from their parents or guardians. I also understand the risks I take by using my own students for my research. To help eliminate the possibility of running my classroom in a way that is not "normal", or the most efficient for the purpose of my research, I will use activities for my research that are already part of my normal curriculum. While I realize using minors complicates my research process, I believe that the value I will gain by using this age group for my research outweighs the risks. By using my students, I am using research subjects who are fully immersed in the learning process. Due to this immersion, my students, and research subjects, have established patterns of cognitive development and preferences. Also, research such as this directly aids those who would most benefit from such pedagogy since current research has not been done explicitly on my desired population.

Since no research has confirmed a psychological connection between personality type and learning style, I will be using my classroom as a site for my own observations and experiments over the next few years. The data collected will not only increase the efficiency and my understanding of my classroom, but

will revolutionize the approach to instruction in the classroom. To conduct this study, each of my students will be given the MBTI, LAI, and LSI at the beginning of the school year. After these assessments are given, I will look for patterns between students' MBTI and their KAI and LSI results, some of which past research has addressed and others which past research has not clarified. I will record any consistency with personality type and learning style pairings, and will hopefully establish a consistent pattern with the pairings. During this case-study-based experiment, all human-subject research protocols will be closely followed.

As an educator in a science classroom, I believe I am uniquely situated to be able to carry out this study in ways teachers of other subjects are not. Since it is very strongly suggested that I use activities and teaching methods that are pre-disposed to being beneficial to particular learners, I will be easily able to test performance correlations for each type of learner using the KAI or LSI. For example, I can design a problem solving activity that is designed for students who are considered Assimilators, and expect that my students who fall into the Assimilator category will not only be the first ones to complete the activity but will have the best performances on it. In this particular case I would expect students who fall into the Diverger classification to take the most time in completing the activity and score well, but not as well as the Assimilators. They can thus be given the extra time they need, and I can develop other activities that allow them to achieve the same learning outcomes.

Throughout the course of the school year, activities will be given sporadically that are designed specifically for the academic success of a specific

type of learner. The success of each student will be evaluated for each of the activities, knowing that the success of the students on each activity is an indicator of how well the student understood the concepts. For example, if concrete active learners are the most successful of the students on the activities structured for concrete active learners, then it would confirm that understanding and comprehension is increased when instruction is differentiated to students' learning styles. Each activity will be considered a case study with each particular case study being done every year to gather data. Between case studies, teaching will be similar to the previous year, but not exactly the same since class composition will change from year to year. To prevent myself from unfairly influencing any students' grades by doing my research, I will only do one activity that is tailored to each learning style per semester, and will use those activities over a span of 5-10 years. This will allow me to collect the data I need to make connections between the research that has already been done without giving myself too much power to influence the grades of my students for my research.

After accumulating a few years of case studies, I will then compile a list of the trends, noting how many times certain trends appear, and the influence of specialized instruction on the overall amount learned. Once these trends and data sets have been tabulated, a training can be set up for teachers on how to use this information to make their classrooms more efficient and to increase their students' understanding. Unfortunately, until more research and testing is done in this field, no official training or method can be established. Once it is though, I plan on being an advocate for this teaching method, one I believe can

revolutionize our education system as we know it.

Appendices

Bibliography

- Boghikian-Whitby, Seta and Yehia Mortagy. "Student Preferences and Performance in Online and Face-To-Face Classes Using Myers-Briggs Indicator: A Longitudinal Quasi-Experimental Study." *Issues in Informing Science & Information Technology*, vol. 13, Jan. 2016, pp. 89-109. EBSCOhost, proxy.bsu.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=118285413&site=ehost-live&scope=site.
- Figueroa, Quinton. "MBTI in Gender -- Men & Women Personality Differences." *Slayerment*, 16 Apr. 2015, www.slayerment.com/mbti-gender.
- "Free Personality Test." 16Personalities, NERIS Analytics, 2018, www.16personalities.com/free-personality-test.
- "Individualize." Merriam-Webster, Merriam-Webster, 9 May 2018, www.merriam-webster.com/dictionary/individualize.
- Isaksen, Scott G., et al. "An Examination of the Relationship between Personality Type and Cognitive Style." *Creativity Research Journal*, vol. 15, no. 4, Oct. 2003, pp. 343-354. EBSCOhost, proxy.bsu.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=11879945&site=ehost-live&scope=site.
- Kummerow, Jean M. and Mary J. Maguire. "Using the Myers-Briggs Type Indicator Framework with an Adlerian Perspective to Increase Collaborative Problem Solving in an Organization." *Journal of Individual Psychology*, vol. 66, no. 2, Summer2010, pp. 188-200. EBSCOhost, proxy.bsu.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=52868333&site=ehost-live&scope=site.
- Matthews, Doris B. "An Investigation of Learning Styles and Perceived Academic Achievement for High School Students." *Clearing House*, vol. 69, no. 4, Mar/Apr96, p. 249. EBSCOhost, proxy.bsu.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=9605304087&site=ehost-live&scope=site.
- Moutafi, J., et al. "Demographic and Personality Predictors of Intelligence: A Study Using the Neo Personality Inventory and the Myers-Briggs Type Indicator." *European Journal of Personality*, vol. 17, no. 1, Jan. 2003, pp. 79-94. EBSCOhost, proxy.bsu.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=10039172&site=ehost-live&scope=site.

"Pearson Product-Moment Correlation." Standard Deviation | How and When to Use the Sample and Population Standard Deviation - A Measure of Spread | Laerd Statistics, Laerd Statistics, 2018, statistics.laerd.com/statistical-guides/pearson-correlation-coefficient-statistical-guide.php.

Schroeder, Charles C. "New Students--New Learning Styles." *Change*, vol. 25, no. 5, Sep/Oct93, p. 21. EBSCOhost, proxy.bsu.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=9311087674&site=ehost-live&scope=site.

Figures:

- 1: MBTI assessment taken October 17, 2017
- 2: MBTI assessment taken May 17, 2017
- 3: Percentage of Americans with each dichotomy preference

Tables:

- 1: Percentage of Americans with each MBTI type
- 2: Correlation of KAI with N-type individuals
- 3: Correlation of KAI with P-type individuals
- 4: Correlation values with their respective classifications
- 5: Percentage of Americans with each TRAILS type and first two MBTI dichotomy preferences